AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the present application.

IN THE CLAIMS:

Claims 1-35. (Canceled).

Claim 36. (New) A device for the analysis of biological molecules linked to a fluorophore, comprising:

a light source emitting at least one laser beam directed into a waveguide support, said waveguide support supporting total internal reflection and comprising a top surface, a bottom surface and at least one edge surface, wherein said biological molecules are affixed to said top surface;

means for directing said at least one laser beam into said edge of said waveguide support; and

a charge couple device for detecting emission spectra of said biological molecules,

wherein said waveguide support is spatially situated between said light source and said charge couple device.

Claim 37. (New) The device of claim 36, further comprising a transparent hexahedron located between said light source and said waveguide support,

wherein said transparent hexahedron occupies the same plane as said at least one laser beam and revolves around an axis perpendicular to said at least one laser beam and directs said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claim 38. (New) The device of claim 36, further comprising an optical wedge located between said light source and said waveguide support and revolving around an axis approximating said at least one laser beam,

wherein said optical wedge directs said at least one laser beam into said waveguide support to effect total internal reflection.

Claim 39. (New) The device of claim 36, further comprising a cylindrical lens located between said light source and said waveguide support and moving perpendicular to the plane of said at least one laser beam,

wherein said cylindrical lens focuses said at least one laser beam into a shape smaller than said edge of said waveguide support to effect total internal reflection.

Claim 40. (New) The device of claim 36, wherein said means for directing said at least one laser beam comprises a mirror located adjacent to said waveguide support,

wherein said mirror directs said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claim 41. (Amended) The device of claim 36, further comprising a diffraction grating located between said light source and said waveguide support,

wherein said diffraction grating selectively allows light of a specific wavelength to excite said fluorophore linked to said biological molecules.

Claim 42. (New) The device of claim 36, further comprising an optical prism located adjacent to said waveguide support,

wherein said optical prism directs said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claim 43. (New) The device of claim 42, further comprising a transparent liquid located between said waveguide support and said optical prism, which possesses a refractive index about equal to the refractive indices possessed by said waveguide support and said optical prism,

wherein said transparent liquid directs said at least one laser beam into said edge of said waveguide support to effect total internal reflection.

Claim 44. (New) The device of claim 36, further comprising bandpass filters located between said waveguide support and said charge coupled device,

wherein said bandpass filters are positioned to receive emitted light and separate emission spectra from said fluorophore.

Claim 45. The device of claim 36, wherein said at least one laser beam is laser beams of four different wavelengths.

Claim 46. The device of claim 45, wherein said laser beams are used with the Arrayed Primer Extension (APEX) assay.

Claim 47. A method for analyzing a nucleic acid sequence in an Arrayed Primer Extension (APEX assay) which comprises exciting and detecting the fluorophore with the device of claim 36.

Claim 48. A method for analyzing a nucleic acid sequence in an Arrayed Primer Extension (APEX assay) which comprises exciting and detecting four spectrally distinct fluorophores sequentially with the device of claim 45.

Claim 49. (New) A method for performing an Arrayed Primer Extension (APEX) assay using the device of claim 36, comprising the steps of:

attaching oligonucleotide primers of a known sequence to said waveguide support,

hybridizing a polynucleotide of interest to said oligonucleotide primers to generate double-stranded oligonucleotides,

incubating said double-stranded oligonucleotides with a polymerase and four spectrally unique fluorescently-labeled

terminating nucleotides to extend the primers into fluorescently-labeled nucleotides,

melting the polynucleotide of interest so that only the extended fluorescently-labeled nucleotides are located on the waveguide support,

washing the waveguide support to remove unincorporated fluorescent material,

placing the waveguide support between the light source and the charge couple device in the device of claim 30, and

detecting the emission from the fluorescent nucleotide with the charge couple device.